APPENDIX E: Loomis NRCA Wildfire Suppression Plan

Loomis NRCA
Fire Suppression Plan

April 2003

Summary

Introduction

The purpose of this plan is to guide fire suppression activity for all uncontrolled fire regardless of origin. Pre-suppression and fuel management activities will be addressed in the Loomis Natural Resources Conservation Area Management (NRCA) Plan. The Loomis NRCA Fire Suppression Plan includes information that will facilitate fire suppression efforts and optimize the protection of the most sensitive resources, in a manner that is most compatible with the management goals of the Loomis NRCA.

Geographic Context

Lack of access, minimal natural firebreaks, heavy fuel types, adjacent land owners/nations, and remote location, make for a challenging fire fighting scenario in the Loomis NRCA. Due to the high potential for a catastrophic fire in the Loomis NRCA, decisions made during initial attack will determine the range of fire fighting techniques available to safely and effectively suppress fire. Both blocks of the Loomis NRCA are contiguous with other public land (State Trust Land, DNR Natural Area Preserve, USFS, Bureau of Land Management, and Canada Protected Area) and the associated land managers meet yearly to discuss fire management issues.

Sensitive Areas

Sensitive areas include pockets of habitat within the NRCA that support or have a high probability of supporting Sensitive, Threatened, or Endangered plant and animal species. Alpine/subalpine meadows, wetlands and wet meadows, riparian habitat, shrub-steppe & dry grassland openings, and rock/talus/cliffs are all sensitive areas. Fire suppression objectives include: communicate and coordinate with resource protection staff and land managers of adjacent land, suppress fire safely, respond quickly, and minimize impacts from fire suppression activities, especially in sensitive areas.

Fuels

Fires are most common in July and August, with fires occurring anytime approximately June through October. The majority of the fuels in the Loomis NRCA are created by the sub-alpine forests. The natural fire regime for sub-alpine forests is infrequent with fires burning, on average, every 70-300 years and with high intensity. Several other vegetation types with similar fire regimes are scattered throughout both conservation area parcels and include fuel models 1, 3, 6, 8, 9, 10, 11 & 12 defined by the National Forest Fire Laboratory.

Policies

The Loomis NRCA is managed according to RCW 79.71 (NRCA Act) to protect natural processes and natural features. The NRCA is also subject to RCW 76.04.750 which states that “every reasonable effort will be made to suppress uncontrolled fires”. Within the NRCA fire may produce beneficial effects and maintains fire-dependent resources, however the responsibility to protect life and adjacent land is paramount.

Wildfire Suppression

DNR is responsible for fighting fire in the Loomis NRCA. Unlike natural resources on trust lands, the natural resources in the NRCA do not require protection from fire however, people and adjacent land do. The immediate and short-term goal is to act safely and aggressively to suppress all uncontrolled fires while using discretion to minimize impacts to ecological systems. Loomis NRCA Fire Control Priorities are as follows:

1. Protect human life.
2. Protect adjacent land.
3. Minimize resource losses (fire suppression impacts to sensitive areas) and fire costs.

A key action to the success of fighting fire in the Loomis NRCA will be employing suppression techniques that minimize disturbance to the environment (Light hand on the Land Techniques and Minimum Impact Suppression Tactics) by DNR fire managers and firefighters. Natural Area Managers will attend and teach short sessions at local district fire schools. The Highlands Fire School will also receive special training on fighting fire in the Loomis NRCA.

Post-Fire

Rehabilitation of the site after a fire will be left to natural processes as much as possible. In addition to the usual erosion and weed control practices, the level of disturbance and relative location to sensitive resources will be assessed to determine how much of the area will be left to recover naturally and how much will be actively restored.

Table of Contents

I. SITE DESCRIPTION

Location:

The Loomis Natural Resource Conservation Area (NRCA) includes two separate parcels (or blocks) and encompasses approximately 24,600 acres located in Okanogan County, Washington. The two parcels are part of the Loomis State Forest and are located 20 miles west and northwest of Tonasket. The northern block is comprised of 13,822 acres located in Township 40 North, Range 24 East, W.M. The southern block is approximately 10,782 acres located at the four corners of Township 37 North, Range 23 East; Township 37 North, Range 24 East; Township 38 North, Range 23 East; Township 38 North, Range 24 East. WM.

Access:

The main vehicle access to the two blocks is by forest roads through the Loomis State Forest. Forest roads are accessed from the Sinlahekin County road and the Loomis Oroville Road. A secondary USFS road connects the Thunder Mt. Road. It enters the southern block from the west off of the USFS 39 road.

Topography:

The northern block is mountainous and includes Disappointment Peak and Snowshoe Mountain. Several other peaks are located in the Chopaka Natural Area Preserve. These mountains have elevation greater than 7,600 feet and drain into basins of creeks that leave the NRCA at an elevation of approximately 4,800 feet. Most of the area drains to the south into the North Fork of Toats Coulee Creek and a small portion of the area drains north into Canada. The topography varies from undulating high elevation grasslands and sedge meadows to forested mountain slopes, steep cliffs and talus.

The southern block includes several peaks that border the area and several creeks that drain into either Sinlahekin or Toats Coulee Creeks. The elevation ranges from approximately 7,000 feet to 5,200 feet. The topography on the southern block is not as extreme as the northern block and has high elevation grass lands, forested slopes, cliffs and talus slopes.

Climate:

Average annual precipitation in the Loomis NRCA is between 18 to 40 inches. Average yearly snowfall varies with elevation, but represents the majority of the precipitation. Winters are cold and long with frost coming any month of the year and frozen ground starting in late October and ending in May depending on the exposure of the slope. Summers are short and dry with frequent electrical storms.

Predominant winds are generally from the southwest or west for much of the year, with periods of more northerly flow during the summer. Occasional strong east, or foehn, winds develop when high pressure air moves toward low pressure off the coast. Severe fire events throughout much of the Pacific Northwest are often associated with strong northerly winds or east winds during summer months.

Local wind patterns typically move air down slopes and valleys in the morning, reversing direction in the afternoon. Therefore, wind movement on the site is typically west to east in the morning and east to west in the afternoon depending upon aspect and topography.

Fire Seasons

Fire season usually lasts from mid to late summer, although fires may occur anytime from approximately June through October depending on weather conditions. The Loomis NRCA is in an area with high potential for lightning storms which most often occur in July and August.

Hydrology:

Both blocks have creeks that range from intermittent to perennial with many seeps and springs. Most of the streams are intermittent at the highest elevations, becoming more seasonal at lower elevations. The northern block contains much of the head-waters to the North Fork Toats Coulee Creek. The southern block contains some headwaters for both Sinlahekin Creek and South Fork of Toats Coulee Creek.

Sensitive Areas

Certain portions of the NRCA have been identified that may be particularly vulnerable to impacts from fire suppression activities (Appendix A, Sensitive Areas Maps). These sensitive areas include pockets of habitat within the Loomis NRCA that support or have a high probability of supporting sensitive, threatened, or endangered plant and animal species. Direct impacts to these areas, especially from heavy machinery and helicopter landings, may damage populations of such species or their habitat. Where a high potential exists for sensitive areas to be impacted by fire suppression activities, high impact activities should be redirected to other locations when possible, while still meeting fire suppression goals of protecting life and property. Habitats identified as Sensitive Areas include:

Alpine/Subalpine Meadows – Vegetation is particularly sensitive to soil disturbance from machinery or heavy trampling. Once soil has been compacted or scrapped away, natural regeneration is significantly inhibited. Soil disturbance should be limited to the edges of these habitats as much as possible.

Wetlands and wet meadows – Soft hydric soils are easily compacted by

machinery. Soil compaction can alter vegetation dynamics and may interrupt hydrologic functions. Many of the sensitive, threatened, or endangered plant and animal species known or suspected in the Loomis occur in wetland and wet meadow habitats. Soil disturbance should be limited to the edges of these habitats as much as possible.

Riparian habitat – Removing or crushing vegetation, and disturbing soils in riparian areas can increase erosion if stream banks are exposed. Soft hydric soils are easily compacted by machinery. Soil compaction can alter vegetation dynamics and may interrupt hydrologic functions.

Shrub-steppe & dry grassland openings - Vegetation is particularly sensitive to soil disturbance from machinery or heavy trampling. Areas of heavy soil disturbance are likely to be colonized by weedy plants and noxious weeds. Regeneration of native species is difficult. Soil disturbance should be limited to the edges of these habitats as much as possible.

Rock/talus/cliffs - These habitats support or may support a disproportionately large number of the sensitive, threatened, or endangered plant and animal species. While not particularly vulnerable to fire suppression activities, substantial movement of talus or rock should be avoided where possible.

Fuels and Fire Regimes

Vegetation, dead and alive, provides fuel for fire and plays a major role in determining where a fire occurs and how it burns . The majority of the Loomis NRCA consists of subalpine fir zone forest (primary source of fuel), most of which is dominated by lodgepole pine. Sub-alpine forests burn infrequently and with high intensity. A small amount of Douglas-fir zone forest occurs at the lowest elevations of both blocks and comprises only a small percentage (less than 5%) of the total NRCA. Other minor vegetation types (secondary sources of fuel) include: shrub steppe, alpine, aspen, wetland plant communities, and harvested areas. Rock outcroppings and talus are natural fuel breaks and may be incorporated in fire suppression tactics.

Fuel loads vary from site to site and among plant communities. Fuel models 1,3,6,8, 9, 10, 11 & 12 (Anderson, 1982) are the most likely scenarios used to describe fire behavior in the Loomis NRCA (See Appendix B for detailed description of vegetation, fuel models and associated fire regimes).

Adjacent Land

The Loomis NRCA is surrounded by public land. The northern block is bordered by the Snowy Mountain Protected Area in Canada to the north, Pasayten Wilderness to the west, Loomis State Forest to the south, and Bureau of Land Management to the east. The Chopaka Natural Area Preserve is located within the northern block.

The southern block is bordered by the Okanogan-Wenatchee National Forest to the south and west and the Loomis State Forest to the north and east.

The land adjacent to the Loomis NRCA is managed to achieve a wide range of land

management goals and objectives. Fire that burns on or into the NRCA and threatens to burn onto adjacent land will require coordination with affected land managers to address fire suppression tactics and strategies. Unless a formal agreement has been made, fires that cross boundaries can create a difficult administrative climate for dealing with the physical and financial impacts of fire. Agreements are in place with the BLM, USFS, and British Columbia that explain how a fire will be managed should it burn near an ownership change or administrative boundary (Appendix C, Northwest Wildland Fire Protection Agreement, 1977). In the future, agreements should be reviewed to incorporate any changes as a result of management planning or policy changes.

Jurisdiction

DNR has fire fighting responsibility within the Loomis NRCA. Fire suppression tactics will be employed according to laws and policies of the DNR. During fire suppression efforts, a Natural Areas Program representative (Appendix D) will be available to advise the incident commander regarding the protection of sensitive resources. It is also recognized that the USFS, BLM and BC Forest Service have reciprocal fire agreements for initial attack with DNR. Inter-agency and international coordination is a common function for fire suppression forces. Sharing information about NRCA fire suppression from the administrative level to the fire fighter level will strengthen the understanding of the land designation and what suppression tactics are most appropriate.

II. POLICIES

The Loomis NRCA is subject to two conflicting policies, the fire suppression RCW which mandates that all fires shall be suppressed and the NRCA RCW that requires that natural processes be protected. The two policies are described below. Fire suppression priorities and objectives for the Loomis NRCA (Section III) are designed to fully meet the requirements of the fire suppression RCW and, to the extent possible, take into consideration land management requirements outlined in the NRCA RCW.

Fire Suppression RCW

The Loomis NRCA is subject to the fire suppression RCW (76.04.750) which states that… "Any fire, on or threatening any forest land, burning uncontrolled and without proper action being taken to prevent its spread, notwithstanding the origin of the fire, is a public nuisance by reason of its menace to life and property. Any person engaged in any activity on such lands, having knowledge of the fire, notwithstanding the origin or subsequent spread thereof on his or her own or other forest lands, and the landowner, shall make every reasonable effort to suppress the fire".

The priorities (Policy 20-001 Fire Suppression) of the Department's fire control program are (in order) to:

1. protect human life,
2. protect natural resources, and
3. minimize resource losses and fire costs.

Natural Resources Conservation Areas RCW

The Loomis NRCA is managed under the Natural Resources Conservation Areas Act, RCW 79.71. Natural Resources Conservation Areas (NRCAs) are managed for conservation purposes to protect high quality examples of typical or unique features including habitat for threatened, endangered, and sensitive species, exceptional scenic landscapes and geologic features in Washington State. NRCAs also provide opportunities for low-impact recreation and outdoor environmental education as long as such uses do not adversely affect the natural features an area is intended to protect.

III. WILDFIRE SUPPRESSION

Discussion

In general, the subalpine fir zone forests in the Loomis NRCA are typical of seral forests maintained by fire in the Okanogan region. Seral forests contain species (lodgepole pine in this case) that generally do not reproduce in their own shade or without some form of disturbance. High elevation lodgepole pine stands are dependant on fire for regeneration. When fire is suppressed, lodgepole pine trees age and die allowing climax species such as Engelmann spruce and sub-alpine fir to gradually arise under the shade of the undisturbed seral species and eventually become the prominent species with a different forest structure.

Past stand replacement fires in and around the Loomis NRCA occurred close enough together to create large areas of relatively even-aged lodgepole pine forest. As the trees reached 80–120 years in age in the late 1980s and early 1990s beetle populations reached epidemic levels. Host trees have been significantly depleted by the beetles and as a consequence, beetle populations are decreasing. The natural progression of the system is for fire to burn the fuels created by the beetles. Most of the area has high levels of fuel, has a natural tendency for stand replacement type fires and natural fuel breaks are sparse. The likelihood of a fire consuming thousands of acres at a time is high.

The preferred option for dealing with wildfire from the perspective of maintaining natural systems, thus protecting the natural resource, would be to allow an area to burn while maintaining enough control to keep the fire contained within the NRCA or at least keep it from burning adjacent resources that require protection from fire. Firefighter safety would remain the top priority along with protecting human life. However, due to the natural widespread accumulation of fuel, minimal fire breaks and the fact that the DNR is mandated to suppress all wildfire, all uncontrolled fires will be suppressed in the NRCA. The maintenance of fire dependent plant communities will depend on prescribed fire, pre-approved with a burn permit.

The #2 priority listed for Fire Control in the Fire Suppression RCW is “protect natural resources”...from fire. As discussed above, the natural resources in the Loomis NRCA do not require protection from fire, however some natural resources adjacent to the NRCA do need protection from fire. Thus, for the purposes of this fire suppression plan, protecting adjacent land is the second priority. Furthermore, in the context of this plan, “minimize resource losses” refers to minimizing damage to sensitive areas.

Loomis NRCA Fire Control Priorities:

1. Protect human life
2. Protect adjacent land
3. Minimize resource losses (impacts to sensitive areas) and fire costs

Objective 1: Communicate and coordinate with Resource Protection staff and land managers of adjacent land.

- Review Loomis NRCA land management objectives and associated suppression tactics in fire training sessions.
- Contact a Natural Areas Program Representative (Northeast Region Natural Areas staff or the Natural Areas Eastside Ecologist) should be contacted when a fire is reported in, or threatening the NRCA.
- Follow procedures for contacting adjacent landowners and permit holders.

Objective 2: Suppress fire safely.

Fire fighter safety is dependant on many factors. Major factors that contributed to firefighter fatalities of the last century have been terrain, isolation, delayed response, limited response time, lack of adequate safety zones and escape routes, communication difficulties, and strategies/tactics that were not in line with predicted fire behavior. The Loomis NRCA lands face the same issues. The time of greatest threat to life is when a fire transitions rapidly from small to large.

- Follow standard personnel safety standards ("Fire Orders" and "Watchouts")
- (L)ookouts – Post an experienced, competent and trusted individual who has knowledge of fire behavior, local weather patterns, the fire personnel's location and their escape routes.
- (C)ommunication - Maintain communication throughout the fire's activity with all personnel, updating as to any changes in the fire behavior, weather activity or safety concerns.
- (E)scape Routes- More than one escape route is needed. Routes must be scouted and identified prior to safe use.
- (S)afety Zones- These areas need to be survivable without a fire shelter. The areas may be of natural origin or created. Area must be scouted, identified with flagging or markers and easily accessible by the fire line personnel.

Objective 3: Respond quickly.

- Check for public presence, location and notification. Post warning signs at (but not limited to) three locations for northern block: Cold Creek, 14 mile and at Iron Gate. In the southern block: USFS 39 road, Lone Frank Road, Thunder Mountain Road, Sinlahekin Road and South Fork of the Toats Coulee Road.
- Consult with Natural Areas Program representative to establish road access and helicopter landing areas to aid fire suppression.

Small, Low Intensity Fires:

- Review location, fuel conditions, agreements with adjacent landowners, weather, likelihood of spread, direction and availability of suppression resources. Determine appropriate response and parties to notify.
- Act quickly and decisively in mobilizing resources due to the long response times to the remote location. Expect limited resources the first hour and what the fire will do, given all the conditions that contribute to fire growth.
- Consider aircraft especially Type 2 & 3 helicopters for fast deployment of firefighters into remote locations and inaccessible areas. This can also aid in the delivery of water and logistical support (caution: high elevation air density reduces load capabilities of aircraft). Smoke - jumpers are another consideration with short response time and special training in difficult terrain.
- Another option to consider is para-cargo planes from the cache at North Cascades Smokejumper Base.
- Support and coordination through Canadian aircraft.

Larger, More Intense Fires:

More than likely, some fires will become large and difficult to contain or control. All control measures are acceptable for the objective of containing this type of fire.

- Ask dispatch to notify the Northeast Region Range Permit Administrator, who will notify permit holders that their stock may be in danger and may assist with the coordination of livestock rescue.
- Notify adjacent land managers.
- Once the fire is contained, measures will be immediately taken to reduce continued disturbance to the area while maintaining control of the fire.

Objective 4: Minimize impacts from fire suppression activities, especially in sensitive areas.

Fire Suppression:

- Burning out to existing firebreaks (roads, cattle trails, rock out crops) is preferable to the construction of new fire lines.
- Water and hand tools will be used to stop the spread of the fire, except under extreme conditions, or if improved structures or other key cultural resources are threatened. Crews will be directed to use M.I.S.T. tactics where applicable.
- In extreme conditions when foam/retardant, and bulldozers are necessary, try and take the opportunity to place fire lines along fence lines, roads, trails, existing vegetation breaks, and ownership boundaries. Foam and retardants are preferable to bulldozers.
- When feasible avoid sensitive areas (see Sensitive Areas Map).
- When applicable, fire vehicles should be confined to roads and bulldozer trails.
- Trees and snags should not be felled unless they pose a danger to firefighters.

Mop-Up:

Mop-up situations are governed by availability of crews, equipment, terrain, as well as current and predicted weather. These conditions makes it more difficult to use a fixed set of rules during mop-up, particularly on the boundaries of the Natural Area and the Canadian Border. Mop up activities should be done with as much care as possible, to minimize impacts to the site, use the following guidelines:

- To the extent possible, water will be used to extinguish the fire to prevent the disturbance of the soil and vegetation area (verses dry mopping,).
- Let the fire burn to containment/confinement/control perimeter line.
- When feasible, conduct mop-up activities at the site boundary and avoid the interior as much as possible. In most cases at least 100 feet inside the fire lines have to be completely put out as soon as possible.

IV. POST-FIRE

Seeding and erosion and weed control will be coordinated with a Natural Areas Advisor and/or the Natural Areas Eastside Ecologist. Natural Areas staff will fully assess burned areas and if necessary will develop a restoration plan according to management guidelines in the Loomis NRCA Management Plan. Generally, all fire trails will be rehabilitated and the site will be allowed to regenerate naturally. However, areas disturbed by fire suppression activities may need to be restored. Large (20+ acres) burned areas may impact grazing rotations. The effects of a fire on grazing will be addressed at Coordinated Resource Management meetings. Implementation of restoration activities should occur before snowfall or the following spring season.

Any road opened for fire suppression activities will be closed off after all suppression activities are completed in the area.

V. REFERENCES

Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press. Washington, D.C. 493pp.

Anderson, H.E. 1982. Aids to Determining Fuel Models For Estimating Fire Behavior. Boise Interagency Fire Center, BLM Warehouse, Boise, Idaho.

VI. APPENDICES

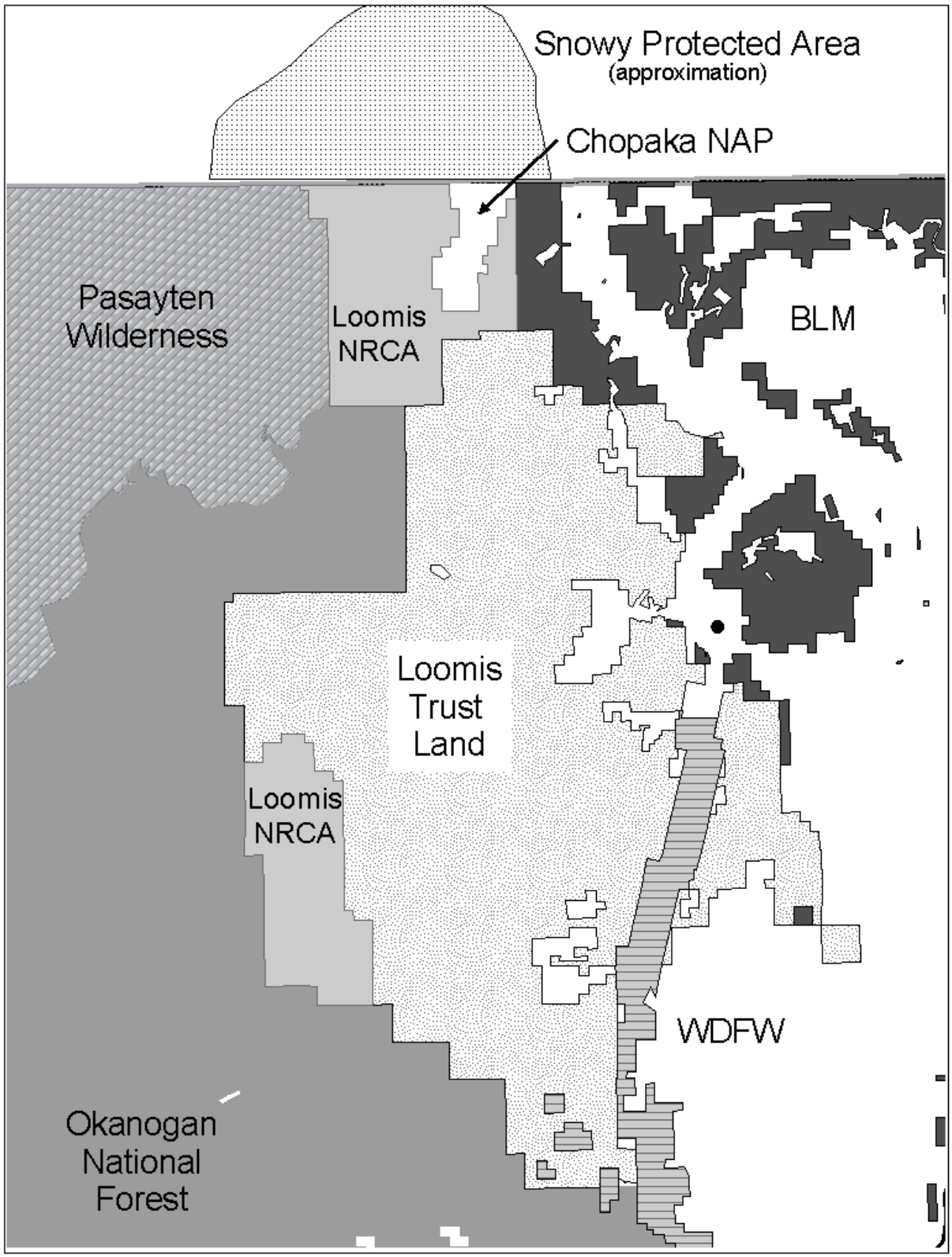
Appendix A: Maps

Appendix B: Fuels and Fire Regimes

Appendix C: The Northwest Wildland Fire Protection Agreement

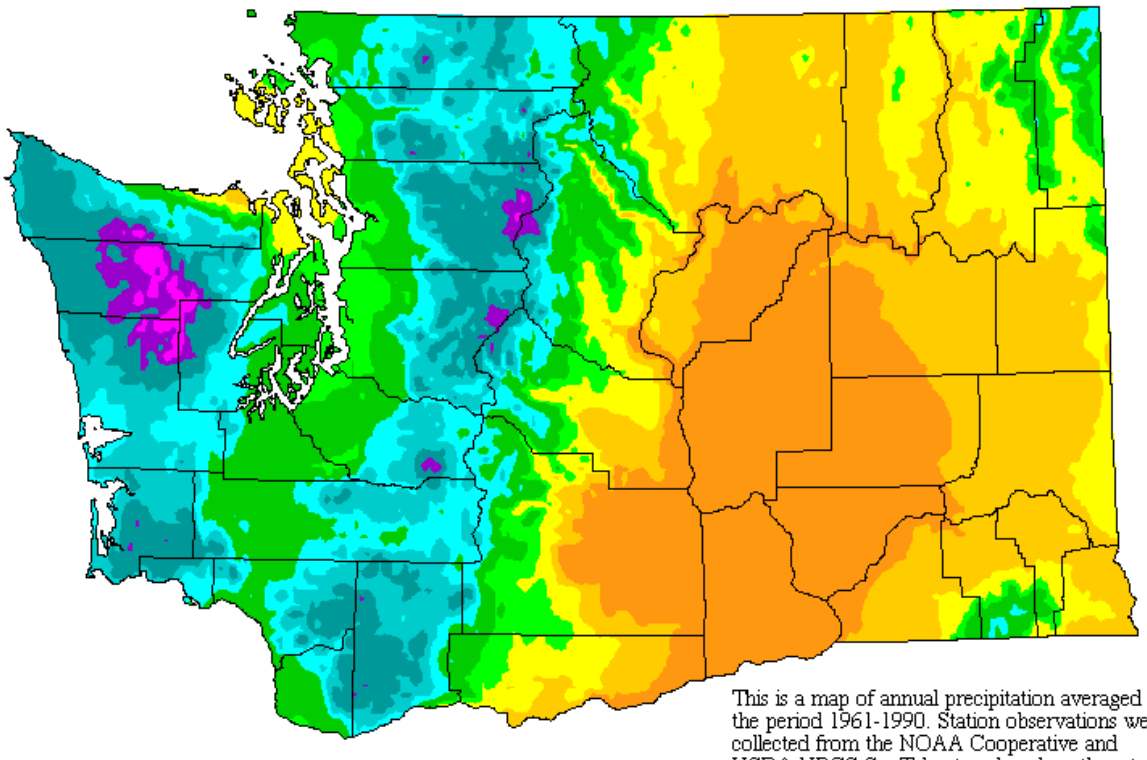
Appendix D: Natural Area Program Representatives

Appendix A: Maps



Average Annual Precipitation

Washington



This is a map of annual precipitation averaged over the period 1961-1990. Station observations were collected from the NOAA Cooperative and USDA-NRCS SnoTel networks, plus other state and local networks. The PRISM modeling system was used to create the gridded estimates from which this map was made. The size of each grid pixel is approximately 4x4 km. Support was provided by the NRCS Water and Climate Center.

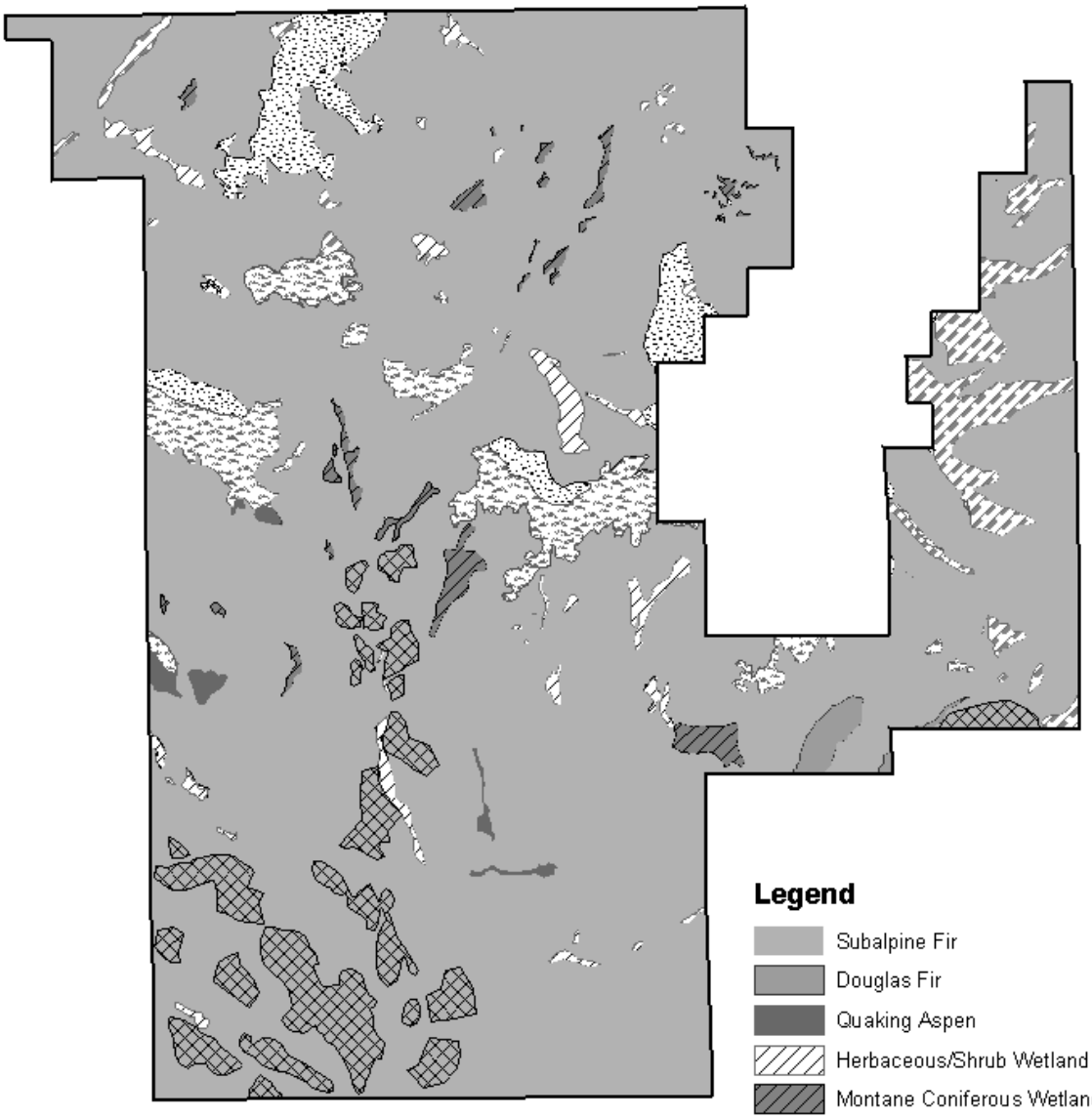
Legend (in inches)

Under 10	60 to 80
10 to 20	80 to 100
20 to 30	100 to 140
30 to 40	140 to 180
40 to 60	Above 180

For information on the PRISM modeling system, visit the SCAS web site at http://www.ocs.orst.edu/prism

The latest PRISM digital data sets created by the SCAS can be obtained from the Climate Source at http://www.climatesource.com

Vegetation - North Block



Legend

- Subalpine Fir
- Douglas Fir
- Quaking Aspen
- Herbaceous/Shrub Wetland
- Montane Coniferous Wetland
- Shrub-steppe
- Alpine
- Rock/Talus
- Harvested Areas (approximate)

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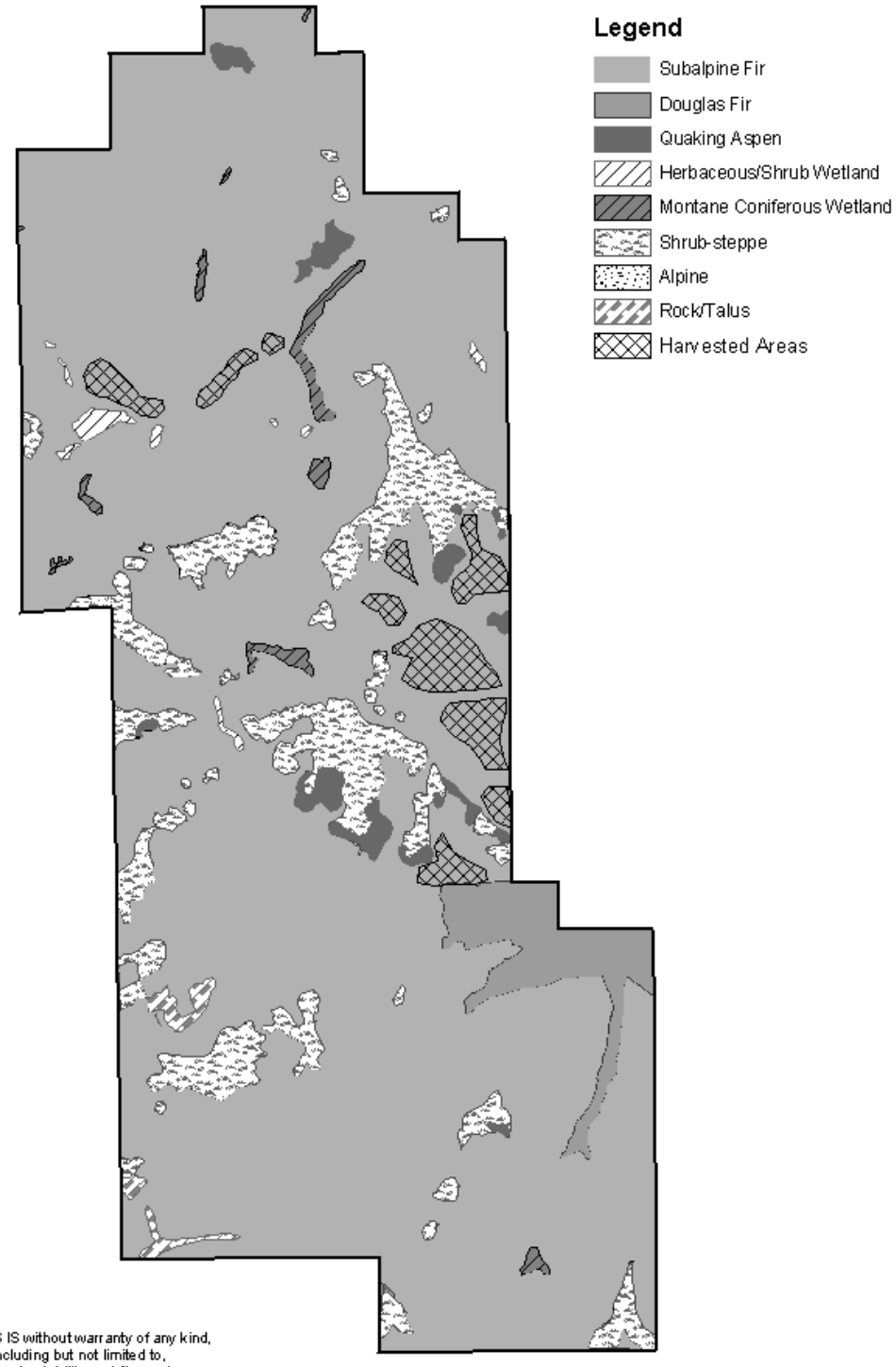
Vegetation - South Block



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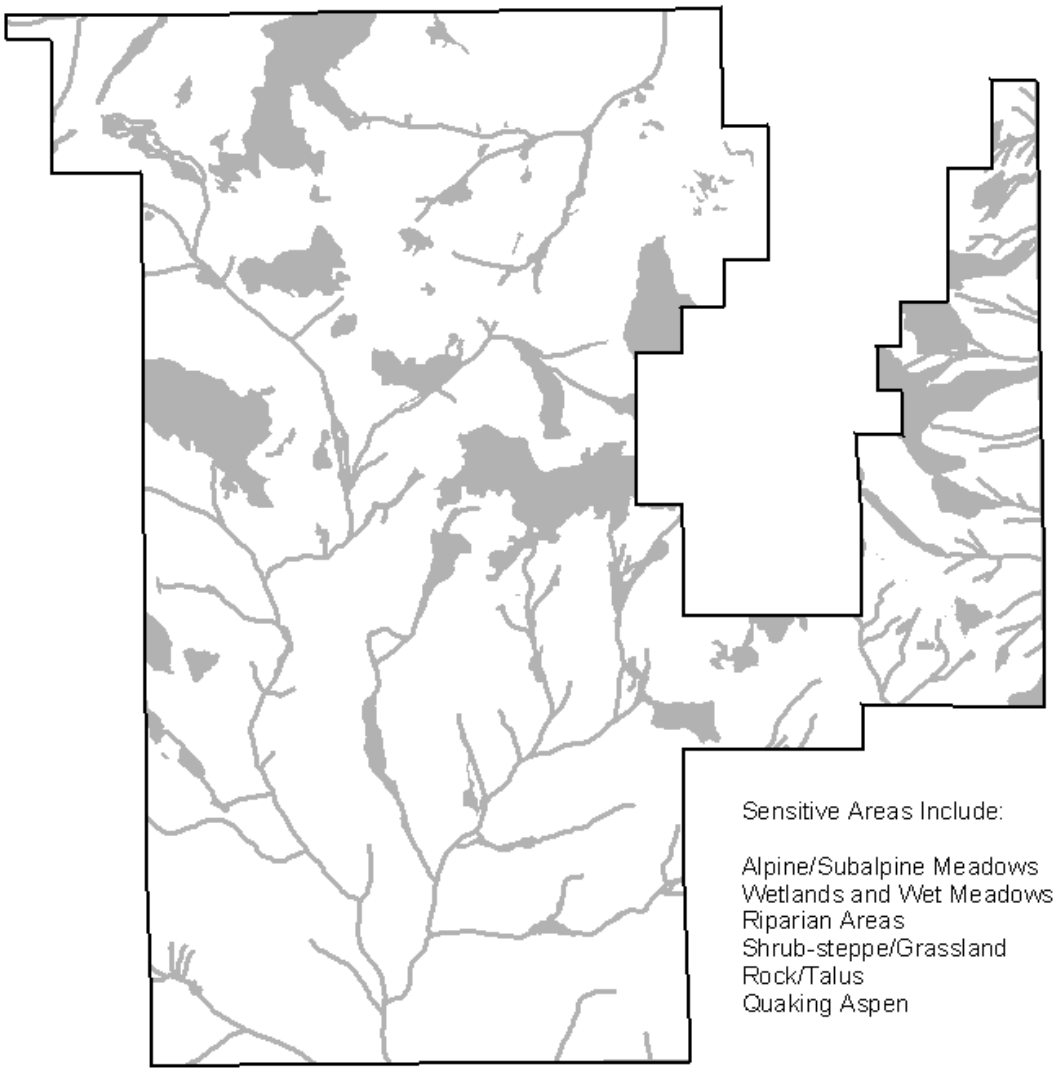
Sensitive Areas - North Block



Sensitive Areas Include:

Alpine/Subalpine Meadows
Wetlands and Wet Meadows
Riparian Areas
Shrub-steppe/Grassland
Rock/Talus
Quaking Aspen

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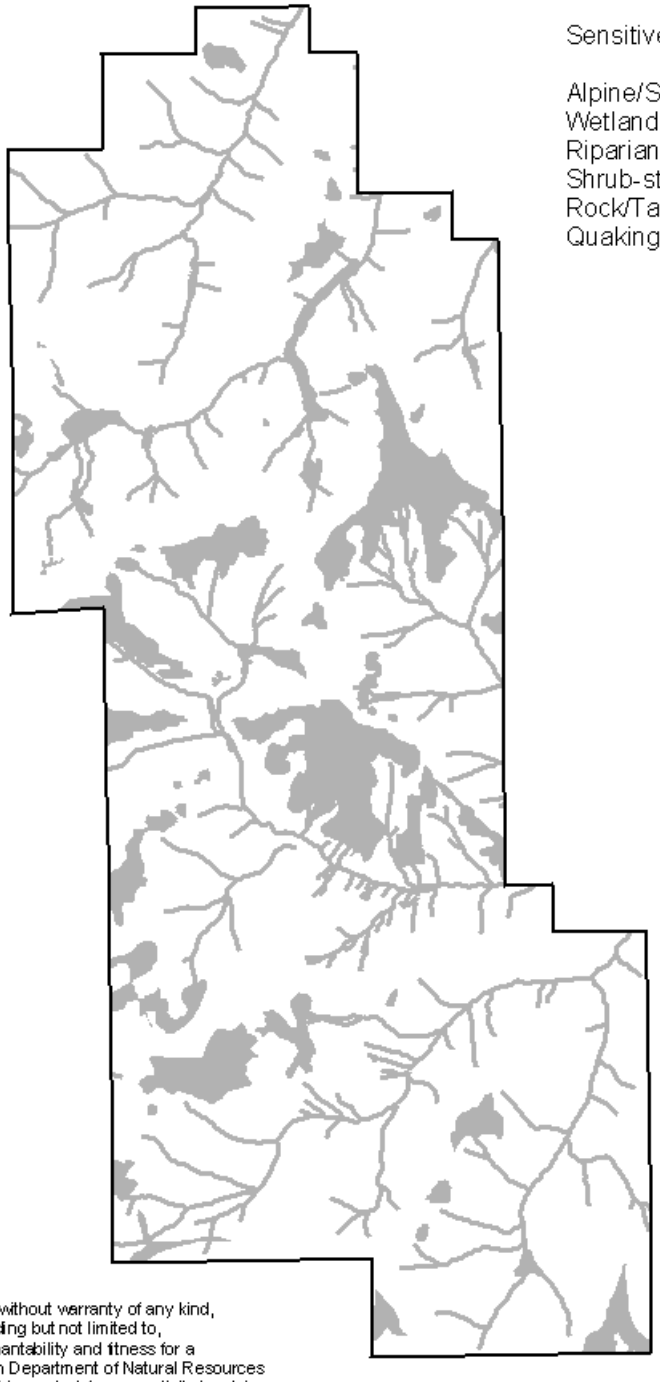
Sensitive Areas - South Block



Sensitive Areas Include:

Alpine/Subalpine Meadows
Wetlands and Wet Meadows
Riparian Areas
Shrub-steppe/Grassland
Rock/Talus
Quaking Aspen

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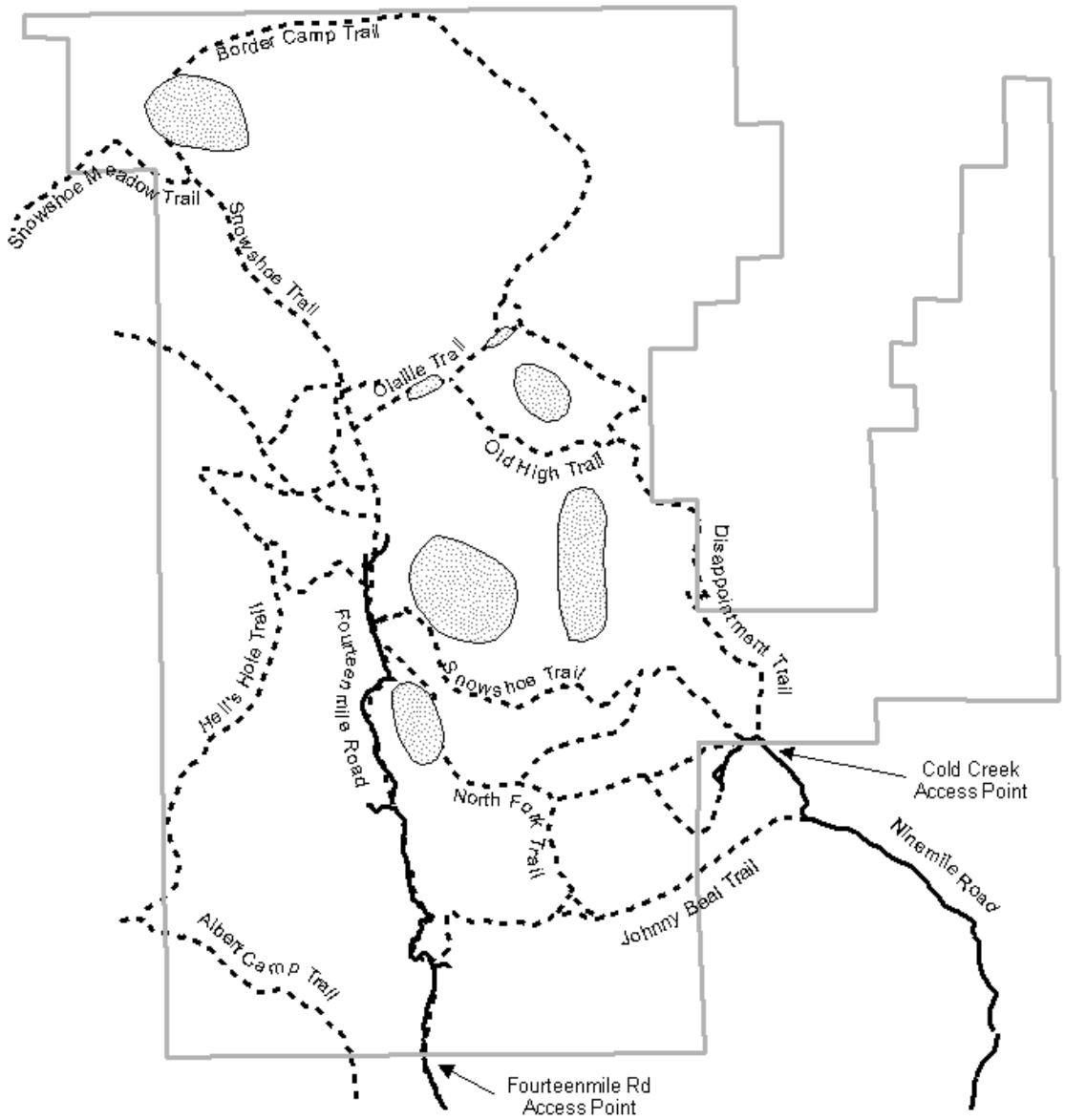
Disturbed Areas - North Block

FOR RESURCE PROTECTION, NOT FOR GENERAL USE.



Legend

Trails
Roads
Snowmobile Play Area
Loomis NRCA

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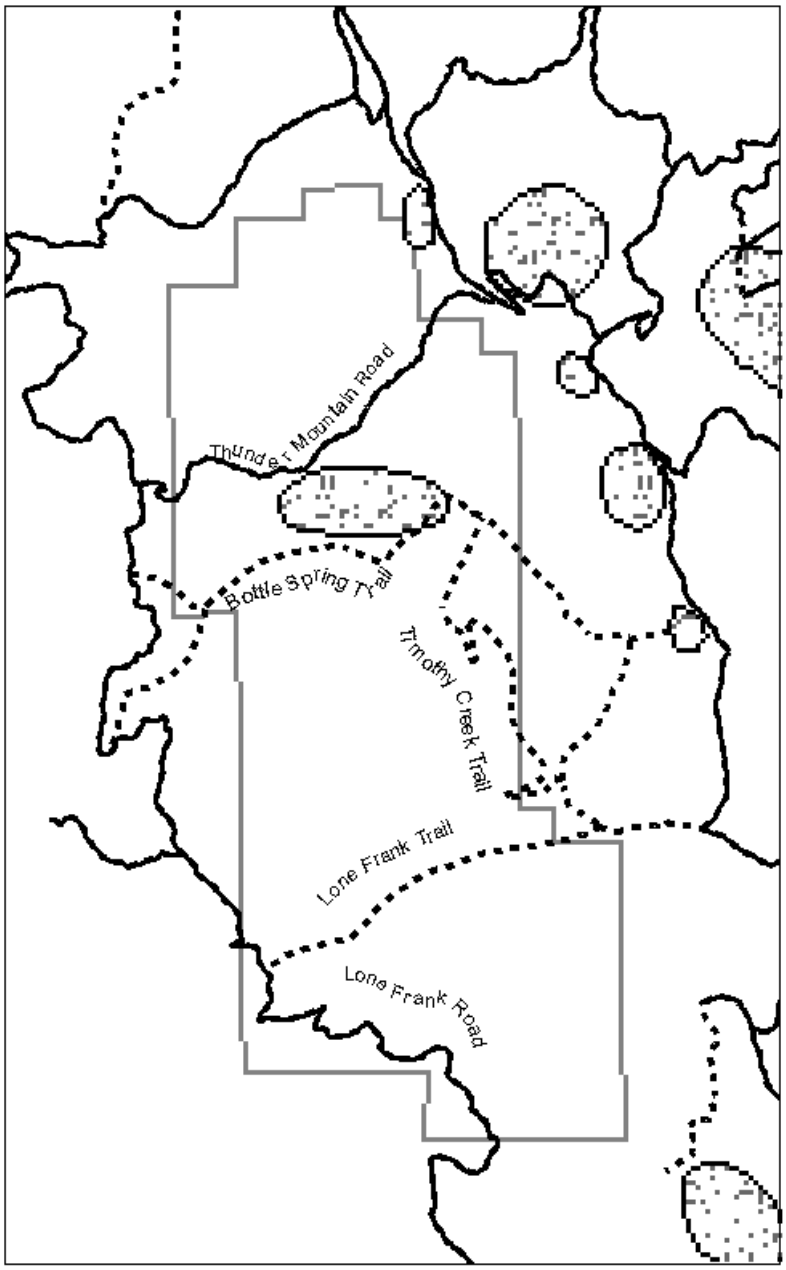
Motorized wheeled vehicle access is limited to emergency and maintenance vehicles.

Disturbed Areas - South Block

FOR RESOURCE PROTECTION, NOT FOR GENERAL USE



Legend

- Trails
- Roads
- Snowmobile Play Area
- Loomis NRCA

Motorized wheeled access is limited to roads.

Loomis NRCA Management Plan

April 2003

Appendix B: Fuels and Fire Regimes

Fire regimes are characterized by frequency and intensity (see Agee, 1993). A frequent fire regime is generally characterized be by fires occurring every 1-25 years, 25-75 years for moderate frequency and 75 – 300 years for infrequent occurrences. High intensity fires are described as stand replacement fires, burn very hot and consume heavy fuel loads. Low intensity fires burn at lower temperatures than high intensity fires and consume less fuel.

Fuel loads vary from site to site and among plant communities. Fuel models 1,3,6,8, 9, 10, 11 & 12 (Anderson, 1982) are the most likely scenarios to describe fire behavior in the Loomis Conservation Areas. The fuel models are described below in association with vegetation communities.

Primary Fuels (Subalpine Fir Zone)

Subalpine fir-zone forest covers most of the NRCA and is found on all aspects at approximately 5,000 feet and higher. Within the Loomis NRCA, the Subalpine Fir Zone has three types of forests, distinguished by moisture – wet, mesic, and dry. These forest types typically burn infrequently and with high intensity. Mean fire return intervals are approximately 70-300 years. Fires are either stand-replacement events, or partial-mortality events that thin the canopy considerably.

Subalpine Fir Zone – dry (Lodgepole pine)

Fire Regime: Infrequent/High Intensity

Fuel Model: 8

Forest canopies in the Subalpine Fir Zone are dominated primarily by lodgepole pine and secondarily by Engelmann spruce. Forests are characterized by a relatively dense single-layer tree canopy and a subcanopy in varying stages of development created by fire events, mountain beetle attacks and pathogens. Stand structure consists of trees which survived a fire event and potentially, a broad spread of understory regeneration. Trees are relatively small and stands are dense. The understories are dominated by short shrubs. Many relatively small snags and logs are typical of mature to old stands.

Ground fires in Fuel Model 8 burn slowly with low flame heights and occasional high fuel concentrations may cause a flare up. A typical fire would burn in the understory consuming fuels slowly. This type of fire may be easier to contain but usually requires extensive time to extinguish. Only under severe weather conditions do these fuels pose a problem.

Subalpine Fir Zone – mesic (Subalpine fir and Lodgepole pine)

Fire Regime: Infrequent/High Intensity

Fuel Model: 8

The majority of this forest type is in the Southern parcel. The dominant species are Lodgepole pine and Subalpine fir. Forests in this vegetation zone generally consist of a single main canopy layer, however, stands of multiple ages are also common. Varying development of sub-canopy/regeneration layers depends on the disturbance interval and the initial stocking pattern. Some stands may have scattered upper canopy layer of larger trees over the dense main layer. The stand structure is variable and may be even-aged, all aged, or mixed age. Shrub understory can be dense in early stages of succession and may become relatively sparse in middle stages of succession because of canopy shading. Grasses and forbs are generally less abundant than shrubs. Woody fuels accumulate on the ground.

Fuel Model 8 is described above.

Subalpine Fir Zone – wet (Engelmann spruce)

Fire Regime: Infrequent/High Intensity

Fuel Model: 10

Patches of this forest type are found on north slopes, along streams, and in other wet areas. Tree species include Engelmann spruce, lodgepole pine and subalpine fir. The site characteristics create a longer fire interval because moist fuels are less likely to burn. The infrequent fire interval leads to large trees and a large load of woody material available for consumption.

Fires classified in Fuel Model 10 typically occur under the forest characteristics described above. Fuel Model 10 fires burn in the surface and ground fuels with greater fire intensity than other timber litter models due to the large load of dead material on the forest floor. The vertical fuel component is also greater with large trees and snags, which increases the potential for crowning, spotting and torching of individual trees. Thus, fuel model 10 has more situations that lead to potentially difficult fires to control. These fires are usually difficult to contain and extinguish. Spot fires are of special concern in this fuel type.

Secondary Fuels

The following fuel types are scattered throughout the NRCA. Most likely the sub-alpine fuel models will predominate, however, these smaller areas, which can be several hundred acres in size, add to the complexity of predicting the behavior of fire in the NRCA.

Douglas Fir Zone

Fire Regime: Infrequent/Moderate-High Intensity

Fuel Model: 8

A small percentage of the vegetation within the Loomis NRCA falls within the Douglas Fir Zone. The forests in this zone are characterized by a semi-open, but relatively continuous, tree canopy. Understory is dominated by shrubs and/or grasses, and may be limited by dense tree growth.

The historical fire regime was characterized by a mixture of frequent, low-severity fire and less frequent, moderate to high severity fire (primarily low-severity fire regimes). Typical pre-settlement fire return intervals were approximately 10-50 years on average. Fire suppression, combined with some management practices, has resulted in dense young canopy layers and ladder fuels, which in turn have increased the probability of stand-replacement high-severity fires and insect/disease outbreaks.

Ground fires in Fuel Model 8 burn slowly with low flame heights and occasional jack pots of fuel concentrations may cause a flare up. A typical fire would burn in the understory consuming fuels slowly. This type of fire may be easier to contain but usually requires extensive time to extinguish. Only under severe weather conditions do these fuels pose a problem

Quaking Aspen

Fire Regime: Infrequent/Low or High Intensity

Fuel Model: 9

Upland aspen stands generally occur in small patches of <5 acres on south or southeast slopes. Stands are usually adjacent to shrub steppe and/or subalpine fir-zone forest. Quaking aspen is generally the only tree present, with occasionally scattered conifers. Understories vary from shrub to grass and forb-dominated vegetation.

Fires run though the surface litter. Rates of spread are variable because of rolling debris and burning materials are easily blown ahead of the main flame

front by the wind. Concentrations of woody material will contribute to possible torching out of trees, spotting, and crowning.

Wetlands

Fire Regime: Infrequent/ Low Intensity

Fuel Model: 1 & 3

Various wetland types occur throughout the Loomis NRCA primarily along or at the head of stream courses or in depressions on hillsides. Elevations vary. Vegetation associated with the wetlands includes grassy herbaceous meadows, shrubs, forbs, and various sedges. Some wetland areas have substantial conifer tree cover.

Fuel Model 1 fires are surface fires that typically move rapidly through the cured grasses and associated material. This fuel model applies to shrub-steppe plant communities with little to no shrub cover.

Fuel model 3 fires are the most intense of the grass group and can have high rates of spread when wind driven. Fire will carry over the top of water. Wood concentrations will have a tendency to cause torching.

Shrub Steppe

Fire Regime: Moderate Frequency/Low Intensity

Fuel Model: 1 & 6

Shrub-steppe vegetation (including dry meadows) is found in 200-300 acre patches at relatively high elevations (5,000-7,000 feet), generally on dry, south-facing slopes. It consists of non-forested areas dominated by bunchgrasses and shrubs, and is mainly devoid of trees. Perennial grasses and forbs generally make up the majority of vegetative cover. Shrubs, primarily mountain big sagebrush, may be absent, widely scattered, or form a dense stand. Some of the areas classified as shrub-steppe do not currently have shrub cover and are actually dry grassy meadows. Occasional trees may be widely scattered. Riparian areas often have dense cover grasses, sedges, tall shrubs and trees.

Fuel Model 1 fires are surface fires that typically move rapidly through the cured grasses and associated material. This fuel model applies to shrub-steppe plant communities with little to no shrub cover.

Fuel Model 6 fires burn along the ground at mid-flame height with moderate winds. Shrubs are older, and not exceeding a height of six feet. This model includes a broad range of covers. It can be expected that a wind driven fire would be very difficult to control and would spread very rapidly. However, this fuel type should burnout quickly and can be extinguished relatively easily.

Alpine (Meadows)

Fire Regime: Infrequently/Low

Fuel Model: 1

In the NRCA, alpine vegetation only occurs above approximately 7,000 feet elevation, on the major peaks including Goodenough, Snowshoe, Disappointment, and in the Chopaka NAP, Joe Mills Mt., Hurley Peak, and Chopaka Mountain. Alpine areas are a mixture of short shrubs, grasses, and forbs. Scattered patches of stunted trees are present in some areas. High elevation trees include alpine larch, white-bark pine, subalpine fir, and Engelmann spruce. Other areas are primarily rock or bare ground with very sparse vegetation and little fuel. Short growing seasons due to the prolonged influence of cold that is often combined with drought create a landscape with light fuel loads and long fire intervals.

Fuel Model 1 fires are surface fires that typically move rapidly through the cured grasses and associated material. This fuel model applies to shrub-steppe plant communities with little to no shrub cover. In alpine landscapes, fire intensity is low due to frost, snowmelt, short burning periods and higher relative humidity.

Harvested Areas

Fire Regime: Infrequently/High Intensity

Fuel Model: 11 & 12

Several areas in the northern block and to a lesser extent in the southern block, have areas that were harvested in 1988, 89' and 93.

Fuel Model 11 fires are fairly active in the slash and herbaceous material intermixed with the slash. Ground fuels are approximately 1' deep. The spacing of the rather light fuel load, shading from the overstory, or the aging of the fine fuels can contribute to limiting the fire potential. Light partial cuts or thinning operations are considered for this fuel model. Clear-cut operations generally produce more slash than represented here. If "red" needles are present Fuel Model 11 should be used.

Fuel Model 12 includes rapidly spreading fires with high intensities capable of generating firebrands can occur. Ground fuels are approximately 2.3' deep and are dominated by slash. Fire is generally sustained until a fuel break or change

in fuels is encountered.

Appendix C: The Northwest Wildland Fire Protection Agreement

This agreement is entered into between the state, provincial, and territorial wildland fire protection agencies' signatory hereto, hereinafter referred to as "members."

For and in consideration of the following terms and conditions, the members agree:

Article I

1.1 The purpose of this agreement is to promote effective prevention, pre-suppression, and control of forest fires in the northwest wildland region of the United States and adjacent areas of Canada (by the members) by providing mutual aid in prevention, pre-suppression, and control of wildland fires and by establishing procedures in operating plans that will facilitate such aid.

Article II

2.1 This agreement shall become effective for those members ratifying it whenever any two or more members, the states of Oregon, Washington, Alaska, Idaho, Montana, the Yukon Territory, the Province of British Columbia or the Province of Alberta have ratified it.

2.2 Any state, province, or territory not mentioned in this article which is contiguous to any member may become a party to this agreement subject to unanimous approval of the members.

Article III

3.1 The role of the members is to determine from time to time such methods, practices, circumstances, and conditions as may be found for enhancing the prevention, pre-suppression, and control of forest fires in the area comprising the members' territory, to coordinate the plans and the work of the appropriate agencies of the appropriate members to each other in fighting wildland fires.

3.2 The members may develop cooperative operating plans for the program covered by this agreement. Operating plans shall include definition of terms, fiscal procedures, personnel contacts, resources available, and standards applicable to the program. Other sections may be added as necessary.

Article IV

4.1 A majority of members shall constitute a quorum for the transaction of its general business. Motions of members present shall be carried by a simple majority, except as stated in Article II. Each member will have one vote on motions brought before them.

Article V

5.1 Whenever a member requests aid from any other members in controlling or preventing wildland fires, the member agrees, to the extent they possibly can, to render all possible aid.

Article VI

6.1 Whenever the forces of any member are aiding another member under this agreement, the employees of such members shall operate under the direction of the officers of the member to whom they are rendering aid and be considered agents of the member they are rendering to and, therefore, have the same privileges and immunities as comparable employees of the member to whom they are rendering aid.

6.2 No member or its officers or employees rendering aid within another state, territory, or province pursuant to this agreement shall be liable on account of any act or omission on the part of such forces while so engaged or on account of maintenance or use of any equipment or supplies in connection therewith to the extent authorized by the laws of the member receiving assistance. The receiving member, to the extent authorized by the laws of the state, territory, or province, agrees to indemnify and save-harmless the assisting member from any such liability.

6.3 Any member rendering outside aid pursuant to this agreement shall be reimbursed by the member receiving such aid for any loss or damage to, or expense incurred in the operation of any equipment and for the cost of all materials, transportation, wages, salaries, and maintenance of personnel and equipment incurred in connection with such request in accordance with the provisions of the previous section. Nothing contained herein shall prevent any assisting member from assuming such loss, damage, expense, or other cost from loaning such equipment or from donating such services to the receiving member without charge or cost.

6.4 For purposes of this agreement, personnel shall be considered employees of each sending member for the payment of compensation to injured employees and death benefits to the representatives of deceased employees injured or killed while rendering aid to another member pursuant to this agreement.

6.5 The members shall formulate procedures for claims and reimbursement under the provisions of this article.

Article VII

7.1 When appropriations for support of this agreement or for the support of common services in executing this agreement are needed, costs will be allocated equally among the members.

7.2 As necessary, members shall keep accurate books of account, showing in full its receipts and disbursements, and the books of account shall be open at any reasonable time to the inspection of representatives of the members.

7.3 The members may accept any and all donations, gifts, and grants of money, equipment, supplies, materials, and services from the federal or any local government or any agency thereof and from any person, firm, or corporation for any of its purposes and functions under this agreement and may receive and use the same subject to the terms, conditions, and regulations governing such donations, gifts, and grants.

Article VIII

8.1 Nothing in this agreement shall be construed to limit or restrict the powers of any member to provide for the prevention, control, and extinguishment of wildland fires or to prohibit the enactment of enforcement of state, territorial, or provincial laws, rules, or regulations intended to aid in such prevention, control, and extinguishment of wildland fires in such state, territory, or province.

8.2 Nothing in this agreement shall be construed to affect any existing or future cooperative agreement between members and/or their respective federal agencies.

Article IX

9.1 The members request the United States Forest Service to act as the coordinating agency of the Northwest Wildland Fire Protection Agreement in cooperation with the appropriate agencies for each member.

9.2 The members will hold an annual meeting to review the terms of this agreement and any applicable operating plans and make necessary modifications.

9.3 Amendments to this agreement can be made by a simple majority vote of the members and will take effect immediately upon passage.

Article X

10.1 This agreement shall continue in force on each member until such member takes action to withdraw therefrom. Such action shall not be effective until sixty (60) days after notice thereof has been sent to all other members.

Article XI

11.1 Nothing in this agreement shall obligate the funds of any member beyond those approved by appropriate legislative action.

Signed by:

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF FORESTS

YUKON TERRITORY
FOREST SERVICE

PROVINCE OF ALBERTA
MINISTRY OF LANDS

STATE OF IDAHO
DEPARTMENT OF LANDS

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

STATE OF OREGON
DEPARTMENT OF FORESTRY

**An original, signed copy is on file with the Department of Natural Resources.